

Claims

- [c1] 1.A method for processing images produced by medical diagnostic imaging systems, comprising:
compressing at least one image of a plurality of temporally distinct medical images of desired physiological features;
transmitting the plurality of temporally distinct medical images to a remote processing system via a network; and
generating an image from the plurality of temporally distinct medical images to highlight temporal differences of the desired physiological features between the image pair.
- [c2] 2.The method of claim 1, wherein compressing the at least one image comprises compressing a new medical image obtained by a medical diagnostic imaging system.
- [c3] 3.The method of claim 1, wherein compressing the at least one image comprises reducing resolution of the at least one image.
- [c4] 4.The method of claim 1, wherein compressing the at least one image comprises subsampling the at least one image.
- [c5] 5.The method of claim 1, wherein compressing the at least one image comprises performing dynamic range reduction on the at least one image.
- [c6] 6.The method of claim 1, wherein compressing the at least one image comprises performing loss-less compression on the at least one image.
- [c7] 7.The method of claim 1, wherein compressing the at least one image comprises reducing memory consumption of the at least one image by a ratio of between 15:1 to 5:1.
- [c8] 8.The method of claim 7, wherein reducing memory consumption comprises reducing the at least one image to a file size between approximately 500 KB and approximately 2MB.
- [c9] 9.The method of claim 1, wherein compressing the at least one image comprises increasing electronic transfer speeds for network transfers of the at least one image.
- [c10] 10.The method of claim 1, wherein transmitting the plurality of medical images comprises communicating with the remote processing system via a uniform interface for

the remote processing system.

- [c11] 11.The method of claim 10, wherein communicating with the remote processing system via the uniform interface comprises interacting between a thin client and an applications service provider.
- [c12] 12.The method of claim 10, wherein transmitting the plurality of temporally distinct medical images comprises initiating an image processing request at the uniform interface for remotely processing the plurality of temporally distinct medical images at the remote processing system.
- [c13] 13.The method of claim 1, wherein transmitting the plurality of temporally distinct medical images comprises gathering medical images from a plurality of image storage systems at medical institutions.
- [c14] 14.The method of claim 13, wherein transmitting the plurality of temporally distinct medical images comprises initiating an image search at the remote processing system to retrieve medical images having the desired physiological features at the plurality of image storage systems.
- [c15] 15.The method of claim 1, wherein transmitting the plurality of temporally distinct medical images comprises encrypting data being transmitted via the network.
- [c16] 16.The method of claim 1, wherein generating the image comprises geometrically matching the desired physiological features in at least two of the plurality of temporally distinct medical images.
- [c17] 17.The method of claim 16, wherein geometrically matching the desired physiological features comprises deforming an older image of the plurality of temporally distinct medical images.
- [c18] 18.The method of claim 16, comprising performing image subtraction between at least two of the plurality of temporally distinct medical images.
- [c19] 19.The method of claim 1, wherein generating the image comprises processing the plurality of temporally distinct medical images in compressed formats.
- [c20] 20.The method of claim 1, wherein generating the image comprises processing at least

two of the plurality of temporally distinct medical images at the remote processing system.

[c21] 21.The method of claim 20, comprising transmitting the image to a client remote from the remote processing system via the network.

[c22] 22.The method of claim 1, comprising automatically evaluating medical criteria and selecting a desired old image from a set of old images from the plurality of temporally distinct medical images.

[c23] 23. The method of claim 1, comprising automatically evaluating medical criteria and determining whether to initiate a temporal analysis of a new image with an old image of the plurality of temporally distinct medical images.

[c24] 24.The method of claim 1, comprising transmitting a report of the temporal differences to a client via the network.

[c25] 25.The method of claim 1, comprising obtaining the plurality of temporally distinct medical images from multiple medical modalities.

[c26] 26.A method for temporal analysis of medical diagnostic images, comprising:
compressing a plurality of temporally distinct medical diagnostic images of desired physiological features;
electronically transmitting the plurality of temporally distinct medical diagnostic images to a remote processing system;
geometrically matching the desired physiological features of at least two images of the plurality of temporally distinct medical diagnostic images at the remote processing system; and
generating an image from the at least two images to highlight physiological differences between the at least two images.

[c27] 27.The method of claim 26, wherein compressing the plurality of temporally distinct medical diagnostic images comprises reducing image resolution.

[c28] 28.The method of claim 26, wherein compressing the plurality of temporally distinct medical diagnostic images comprises reducing memory consumption by a ratio between approximately 15:1 and approximately 5:1.

- [c29] 29.The method of claim 28, wherein reducing memory consumption comprises reducing memory consumption to less than approximately 1.5MB.
- [c30] 30.The method of claim 26, wherein compressing the plurality of temporally distinct medical diagnostic images comprises reducing network transfer times to facilitate remote image processing.
- [c31] 31.The method of claim 26, wherein electronically transmitting the plurality of temporally distinct medical diagnostic images comprises communicating with the remote processing system via a uniform interface for the remote processing system.
- [c32] 32.The method of claim 26, wherein electronically transmitting the plurality of temporally distinct medical diagnostic images comprises electronically securing the plurality of temporally distinct medical diagnostic images to prevent unwanted access.
- [c33] 33.The method of claim 26, wherein electronically transmitting the plurality of temporally distinct medical diagnostic images comprises remotely searching a plurality of remote image storage systems for medical images having the desired physiological features.
- [c34] 34.The method of claim 26, wherein geometrically matching the desired physiological features comprises deforming a relatively older image of the at least two images.
- [c35] 35.The method of claim 34, wherein generating the image comprises subtracting the relatively older image from a newer image of the at least two images via an image subtraction routine disposed on the remote processing system.
- [c36] 36.The method of claim 35, comprising electronically transmitting the image to a remote client.
- [c37] 37.The method of claim 26, comprising automatically evaluating medical criteria and selecting a desired old image from a set of old images from the plurality of temporally distinct medical diagnostic images.
- [c38] 38. The method of claim 26, comprising automatically evaluating medical criteria and determining whether to initiate a temporal analysis of a new image with an old image of the plurality of temporally distinct medical diagnostic images.
- [c39] 39.The method of claim 26, comprising transmitting a report of the physiological

differences to a client via a network.

[c40] 40.The method of claim 26, wherein geometrically matching the desired physiological features of the at least two images comprises coordinating output from multiple imaging modalities.

[c41] 41.A method for remotely performing a comparative analysis of a plurality of medical diagnostic images obtained over a time period, comprising:
gathering medical diagnostic images at a remote processing system via a network; and
processing at least two images of the medical diagnostic images at the remote processing system to generate a temporal analysis image illustrating physiological differences between the at least two images.

[c42] 42.The method of claim 41, wherein gathering medical diagnostic images comprises compressing at least one image of the medical diagnostic images prior to an electronic transfer over the network.

[c43] 43.The method of claim 42, wherein compressing the at least one image comprises reducing image resolution of the at least one image.

[c44] 44.The method of claim 42, wherein compressing the at least one image comprises reducing memory consumption of the at least one image by a ratio of greater than 5:1.

[c45] 45.The method of claim 42, wherein compressing the at least one image comprises reducing memory consumption of the at least one image to a desired size based on network transmission efficiencies.

[c46] 46.The method of claim 41, wherein gathering the medical diagnostic images comprises gathering images having desired physiological features from a plurality of remote image storage systems.

[c47] 47.The method of claim 46, wherein gathering the medical diagnostic images comprises interacting with the remote image storage systems via a uniform interface configured for interacting with the remote processing system.

[c48] 48.The method of claim 46, wherein gathering the medical diagnostic images comprises receiving an image processing request from a uniform interface configured for remotely

interacting with the remote processing system.

- [c49] 49.The method of claim 41, wherein processing the at least two images comprises geometrically matching desired physiological features in the at least two images.
- [c50] 50.The method of claim 41, wherein processing the at least two images comprises subtracting a first image of the at least two images from a second image of the at least two images.
- [c51] 51.The method of claim 41, wherein processing the at least two images comprises generating the temporal analysis at least partially at the remote processing system.
- [c52] 52.The method of claim 41, wherein processing the at least two images comprises processing the at least two images in compressed formats.
- [c53] 53.The method of claim 41, wherein processing the at least two images comprises coordinating output from imaging systems for multiple medical modalities.
- [c54] 54.The method of claim 41, comprising securely communicating image data between a client and the remote processing system via the network.
- [c55] 55.The method of claim 54, comprising encrypting the image data.
- [c56] 56.The method of claim 41, comprising transmitting results of the processing to a remote client via the network.
- [c57] 57.The method of claim 41, comprising automatically evaluating medical criteria and selecting a desired old image from a set of old images from the medical diagnostic images.
- [c58] 58. The method of claim 41, comprising automatically evaluating medical criteria and determining whether to initiate a temporal analysis of a new image with an old image of the medical diagnostic images.
- [c59] 59.A system for remotely processing medical diagnostic images, comprising:
a remote processing system configured to compare a plurality of medical images and to highlight temporal differences between at least two images of the plurality of medical images;

a uniform interface for interacting with the remote processing system via a network; and
an image compression module accessible by the uniform interface configured to
compress at least one image of the plurality of medical images.

[c60] 60.The system of claim 59, wherein the remote processing system comprises an modality
matching module configured to coordinate imaging data obtained from different medical
imaging modalities.

[c61] 61.The system of claim 59, wherein the remote processing system comprises an image
matching module configured for geometrically matching the desired physiological
features in the at least two images.

[c62] 62.The system of claim 61, wherein the image matching module comprises an image
deformation module configured for altering one of the at least two images.

[c63] 63.The system of claim 61, wherein the remote processing system comprises an image
subtraction module configured for subtracting a first image from a second image of the
at least two images.

[c64] 64.The system of claim 59, wherein the remote processing system comprises an image
search module configured for retrieving remote medical images from image storage
systems coupled to the network.

[c65] 65.The system of claim 59, wherein the remote processing system comprises an image
compression module configured for compressing uncompressed images prior to image
processing at the remote processing system.

[c66] 66.The system of claim 59, wherein the uniform interface comprises a platform
independent interface assembly.

[c67] 67.The system of claim 66, wherein the platform independent interface
assembly comprises a thin client.

[c68] 68.The system of claim 59, wherein the uniform interface is coupled to an image storage
system for at least one medical diagnostic imaging system in a medical institution.

[c69] 69.The system of claim 59, comprising a plurality of uniform interfaces disposed at a
plurality of medical institutions.

[c70] 70.The system of claim 59, wherein the uniform interface has a processing request module configured for transmitting to the remote processing system a new image of the plurality of medical images and a request for temporal comparison with at least one old image of the plurality of medical images.

[c71] 71.The system of claim 59, wherein the image compression module comprises compression routines configured for reducing memory consumption of the at least one image to a desired size based on network transfer efficiencies of the network.

[c72] 72.The system of claim 71, wherein the desired size is less than approximately 1.5MB.

[c73] 73.The system of claim 71, wherein the compression routines comprise a subsampling routine.

[c74] 74.The system of claim 71, wherein the compression routines comprise a dynamic range reduction routine.

[c75] 75.The system of claim 71, wherein the compression routines comprise a loss-less compression routine.

[c76] 76.The system of claim 59, comprising an image selection module configured for automatically evaluating medical criteria and selecting a desired old image from a set of old images from the plurality of medical images.

[c77] 77. The system of claim 59, comprising an image processing decision module configured for automatically evaluating medical criteria and determining whether to initiate a temporal analysis of a new image with an old image of the plurality of medical images.

[c78] 78.The system of claim 59, comprising a transmission security module configured for securely transmitting image data via the network.

[c79] 79.A system for platform independent processing of medical diagnostic images, comprising:
an applications server configured to execute temporal image analysis requests from remote platform independent interfaces, wherein the applications server comprises:
an image matching module configured for geometrically matching desired physiological features in at least two images obtained over a time period; and

an image subtraction module configured for subtracting a first image from a second image of the at least two images.

[c80] 80.The system of claim 79, wherein the applications server comprises an image compression module configured for compressing uncompressed images of the at least two images prior to executing the temporal image analysis.

[c81] 81.The system of claim 79, wherein the remote processing system comprises an image search module configured for retrieving remote medical images from image storage systems coupled to the network.

[c82] 82.The system of claim 79, wherein the remote processing system comprises an image selection module configured for automatically evaluating medical criteria and selecting a desired old image from a set of old images from the at least two images.

[c83] 83. The system of claim 79, wherein the remote processing system comprises an image processing decision module configured for automatically evaluating medical criteria and determining whether to execute the temporal image analysis of a new image with an old image of the at least two images.

[c84] 84.The system of claim 79, wherein the image matching module comprises an image deformation module configured for altering one of the at least two images.

[c85] 85.The system of claim 79, wherein the image matching module is configured for coordinating imaging data from different imaging modalities.

[c86] 86.The system of claim 79, comprising a data encryption module.

[c87] 87.A subtracted medical diagnostic image produced by the method of claim 1.

[c88] 88.A subtracted medical diagnostic image produced by the method of claim 26.

[c89] 89.A subtracted medical diagnostic image produced by the method of claim 41.

[c90] 90.A subtracted medical diagnostic image produced by the system of claim 59.

[c91] 91.A subtracted medical diagnostic image produced by the system of claim 79.